Technical Notes for May 2007 OES Estimates

Scope of the Survey

The Occupational Employment Statistics (OES) survey is a semiannual mail survey measuring occupational employment and wage rates for wage and salary workers in nonfarm establishments in the United States. Guam, Puerto Rico, and the Virgin Islands also are surveyed, but their data are not included in this release. OES estimates are constructed from a sample of about 1.2 million establishments. Forms are mailed to approximately 200,000 establishments in May and November of each year for a 3-year period. The nationwide response rate for the May 2007 survey was 77.9 percent based on establishments and 73.5 percent based on employment. The survey included establishments sampled in the May 2007, November 2006, May 2006, November 2005, May 2005, and November 2004 semiannual panels.

The Occupational Coding System

The OES survey uses the Office of Management and Budget's (OMB) occupational classification system, the Standard Occupational Classification (SOC) system. The SOC system is the first OMB-required occupational classification system for federal agencies. The OES survey categorizes workers in 1 of 801 detailed occupations. Together, these detailed occupations make up 23 major occupational groups, one of which— military specific occupations—is not included in the OES survey. The major groups are as follows:

- Management occupations
- Business and financial operations occupations
- Computer and mathematical occupations
- Architecture and engineering occupations
- Life, physical, and social science occupations
- Community and social services occupations
- Legal occupations
- Education, training and library occupations
- Arts, design, entertainment, sports, and media occupations
- Healthcare practitioner and technical occupations
- Healthcare support occupations
- Protective service occupations
- Food preparation and serving related occupations
- Building and grounds cleaning and maintenance occupations
- Personal care and service occupations
- Sales and related occupations
- Office and administrative support occupations
- Farming, fishing, and forestry, occupations
- Construction, and extraction occupations

- Installation, maintenance, and repair occupations
- Production occupations
- Transportation and material moving occupations
- Military specific occupations (not surveyed in OES).

For more information about the SOC system, please see the BLS Web site at www.bls.gov/soc/.

The Industry Coding System

The OES survey uses the North American Industry Classification System (NAICS). For more information about NAICS, see the BLS Web site at www.bls.gov/bls/naics.htm.

The OES survey includes establishments in NAICS sectors 11 (logging and agricultural support activities only), 21, 22, 23, 31-33, 42, 44-45, 48-49, 51, 52, 53, 54, 55, 56, 61, 62, 71, 72, 81 (except private households), state government, and local government. The U.S. Postal Service and the executive branch of the federal government also are included. An establishment is defined as an economic unit that processes goods or provides services, such as a factory, mine, or store. The establishment is generally at a single physical location and is engaged primarily in one type of economic activity.

The OES survey covers all full- and part-time wage and salary workers in nonfarm industries. The survey does not include the self-employed, owners and partners in unincorporated firms, household workers, or unpaid family workers.

Survey Sample

BLS funds the survey and provides the procedures and technical support, while the State Workforce Agencies (SWAs) collect most of the data. BLS produces cross-industry and industry-specific estimates for the nation, states, metropolitan statistical areas (MSAs), metropolitan divisions, and nonmetropolitan areas. Industry-specific estimates are produced at the NAICS sector, 3-digit, 4-digit, and selected 5-digit industry levels. BLS releases all cross-industry and national estimates; the SWAs release industry-specific estimates at the state and MSA levels.

State Unemployment Insurance (UI) files provide the universe from which the OES survey draws its sample. Employment benchmarks are obtained from reports submitted by employers to the UI program. Supplemental sources are used for rail transportation (NAICS 4821) and Guam because they do not report to the UI program. The OES survey sample is stratified by metropolitan and nonmetropolitan areas and industry. Samples selected in panels prior to May 2005 were stratified using MSA definitions based on the 1990 Metropolitan Statistical Area standards. Beginning with the May 2005 panel, the sample was stratified using new MSA definitions based on the 2000 Metropolitan Statistical Area standards.

An annual census is taken of the executive branch of the federal government, the U.S. Postal Service, state government, and Hawaii's local government. In order to provide the most occupational coverage, larger employers are more likely to be selected than smaller employers. The un-weighted employment of sampled establishments makes up approximately 65 percent of total national employment.

Concepts

Occupational employment is the estimate of total wage and salary employment in an occupation across the industries surveyed. The OES survey defines employment as the number of workers who can be classified as full- or part- time employees, including workers on paid vacations or other types of paid leave; workers on unpaid short-term absences; salaried officers, executives, and staff members of incorporated firms; employees temporarily assigned to other units; and employees for whom the reporting unit is their permanent duty station regardless of whether that unit prepares their paycheck.

The OES survey form sent to establishments with more than 10 workers contains between 50 and 225 SOC occupations selected on the basis of the sampled establishment's industry classification. To reduce paperwork and respondent burden, no survey form contains every SOC occupation. Thus, data for specific occupations are collected primarily from establishments in industries that are the predominant employers of workers in those occupations. Each survey form is structured, however, to allow a respondent to provide detailed occupational information for each worker at the establishment; that is, unlisted occupations can be added to the survey form. Employers with 10 or fewer workers are sent a form with no occupations listed, and are instructed to fill in the occupations for their workers.

Wages for the OES survey are straight-time, gross pay, exclusive of premium pay. Base rate, cost-of-living allowances, guaranteed pay, hazardous-duty pay, incentive pay including commissions and production bonuses, tips, and on-call pay are included. Excluded wages are back pay, jury duty pay, overtime pay, severance pay, shift differentials, nonproduction bonuses, employer cost for supplementary benefits, and tuition reimbursements.

The OES survey collects wage data in 12 intervals. Employers report the number of employees in an occupation per each wage range. The wage intervals used for the May 2007 estimates are as follows:

For May 2007, November 2006, May 2006 and November 2005 panels:

Interval	Hourly Wages	Annual Wages
Range A	Under $7.50	Under $15,600
Range B	$7.50 to $9.49	$15,600 to $19,759
Range C	$9.50 to $11.99	$19,760 to $24,959
Range D	$12.00 to $15.24	$24,960 to $31,719
Range E	$15.25 to $19.24	$31,720 to $40,039
Range F	$19.25 to $24.49	$40,040 to $50,959
Range G	$24.50 to $30.99	$50,960 to $64,479
Range H	$31.00 to $39.24	$64,480 to $81,639
Range I	$39.25 to $49.74	$81,640 to $103,749
Range J	$49.75 to $63.24	$103,480 to $131,559
Range K	$63.25 to $79.99	$131,560 to $166,399
Range L	$80.00 and over	$166,400 and over

For May 2005 and November 2004 panels:

Interval	Hourly Wages	Annual Wages
Range A	Under $6.75	Under $14,040
Range B	$6.75 to $8.49	$14,040 to $17,679
Range C	$8.50 to $10.74	$17,680 to $22,359
Range D	$10.75 to $13.49	$22,360 to $28,079
Range E	$13.50 to $16.99	$28,080 to $35,359
Range F	$17.00 to $21.49	$35,360 to $44,719
Range G	$21.50 to $27.24	$44,720 to $56,679
Range H	$27.25 to $34.49	$56,680 to $71,759
Range I	$34.50 to $43.74	$71,760 to $90,999
Range J	$43.75 to $55.49	$91,000 to $115,439
Range K	$55.50 to $69.99	$115,440 to $145,599
Range L	$70.00 and over	$145,600 and over

Mean hourly wage. The mean hourly wage rate for an occupation is the total wages that all workers in the occupation earn in an hour divided by the total employment of the occupation. To calculate the mean hourly wage of each occupation, total weighted hourly wages are summed across all intervals and divided by the occupation's weighted survey employment. The mean wage for each interval is based on occupational wage data collected by the BLS Office of Compensation and Working Conditions for the National Compensation Survey (NCS).

Beginning with the November 2005 panel the lower boundary of the highest wage interval was increased from $70.00 to $80.00. The mean hourly wage value for the highest wage interval was computed separately for NCS data from 2005 for $80.00 and over, and from 2004 and 2003 for $70.00 and over. The mean wage rate from 2006 was used for the $80.00 and over interval for the May 2007, November 2006, May 2006, and November 2005 panels. The average of the 2004 and 2003 mean wage rates was used for the $70.00 and over interval for the May 2005 and November 2004 panels.

Percentile wage. The p-th percentile wage rate for an occupation is the wage where p percent of all workers earn that amount or less and where (100-p) percent of all workers earn that amount or more. This statistic is calculated by uniformly distributing the workers inside each wage interval, ranking the workers from lowest paid to highest paid, and calculating the product of the total employment for the occupation and the desired percentile to determine the worker that earns the p-th percentile wage rate.

Annual wage. Many employees are paid at an hourly rate by their employers and may work more than or less than 40 hours per week. Annual wage estimates for most occupations in this release are calculated by multiplying the mean hourly wage by a "year-round, full-time" figure of 2,080 hours (52 weeks by 40

hours). Thus, annual wage estimates may not represent the actual annual pay received by the employee if they work more or less than 2,080 hours per year. Workers in some occupations typically work less than full time, year round. For these occupations, the OES survey collects and reports either the annual salary or the hourly wage rate, depending on how the occupation is typically paid, but not both. For example, teachers, flight attendants, and pilots may be paid an annual salary, but do not work the usual 2,080 hours per year. In this case, an annual salary is reported. Other workers, such as entertainment workers, are paid hourly rates, but generally do not work full time, year round. For these workers, only an hourly wage is reported.

Hourly versus annual wage reporting. For each occupation, respondents are asked to report the number of employees paid within specific wage intervals. The intervals are defined both as hourly rates and the corresponding annual rates, where the annual rate for an occupation is calculated by multiplying the hourly wage rate by a typical work year of 2,080 hours. The responding establishment can reference either the hourly or the annual rate for full- time workers, but they are instructed to report the hourly rate for part-time workers.

Estimation Methodology

Each OES panel includes approximately 200,000 establishments. The OES survey is designed to produce estimates using six panels (3 years) of data. The full six-panel sample of 1.2 million establishments allows the production of estimates at detailed levels of geography, industry, and occupation.

Wage updating. Significant reductions in sampling errors are obtained by combining six panels of data, particularly for small geographic areas and occupations. Wages for the current panel need no adjustment. However, wages in the five previous panels need to be updated to the current panel's reference period. The OES program uses the BLS Employment Cost Index (ECI) to adjust survey data from prior panels before combining them with the current panel's data. The wage updating procedure adjusts each detailed occupation's wage rate, as measured in the earlier panel, according to the average movement of its broader occupational division. The procedure assumes that there are no major differences by geography, industry, or detailed occupation within the occupational division. The wage rates for the highest wage interval are not updated.

Imputation. About 20 percent of establishments do not respond for a given panel. A "nearest neighbor" hot deck imputation procedure is used to impute missing occupational employment totals. A variant of mean imputation is used to impute missing wage distributions. The variant of mean imputation for wage distributions also is applied to establishments that provide reports with occupational totals but partial or missing wage data.

Weighting and benchmarking. The sample establishments in each panel are weighted to represent all establishments that were part of the in-scope frame from which the panel was selected. Based on the sampled establishments, sampling weights are adjusted when six panels are combined. Sampling weights are further adjusted by the ratio of employment totals (the average of November 2006 and May 2007 employment) from the BLS Quarterly Census of Employment and Wages to employment totals from the OES survey.

May 2007 OES survey estimates. The May 2007 OES survey estimates are based on all data collected from establishments in the May 2007, November 2006, May 2006, November 2005, May 2005, and November 2004 semiannual samples.

Reliability of the estimates. Estimates calculated from a sample survey are subject to two types of error: sampling and nonsampling. Sampling error occurs when estimates are calculated from a subset (that is, a sample) of the population instead of the full population. When a sample of the population is surveyed, there is a chance that the sample estimate of the characteristic of interest may differ from the population value of that characteristic. Differences between the sample estimate and the population value will vary depending on the sample selected. This variability can be estimated by calculating the standard error (SE) of the sample estimate. If we were to repeat the sampling and estimation process countless times using the same survey design, approximately 90 percent of the intervals created by adding and subtracting 1.645 SEs from the sample estimate would include the population value. These intervals are called 90-percent confidence intervals. The OES survey, however, usually uses the relative standard error (RSE) of a sample estimate instead of its SE to measure sampling error. RSE is defined as the SE of a sample estimate divided by the sample estimate itself. This statistic provides the user with a measure of the relative precision of the sample estimate. RSEs are calculated for both occupational employment and mean wage rate estimates. Occupational employment RSEs are calculated using a subsample, random group replication technique called the jackknife. Mean wage rate RSEs are calculated using a variance components model that accounts for both the observed and unobserved components of the wage data. The variances of the unobserved components are estimated using wage data from the BLS National Compensation Survey. In general, estimates based on many establishments have lower RSEs than estimates based on few establishments. If the distributional assumptions of the models are violated, the resulting confidence intervals may not reflect the prescribed level of confidence.

Nonsampling error occurs for a variety of reasons, none of which are directly connected to sampling. Examples of nonsampling error include: nonresponse, data incorrectly reported by the respondent, errors in the administrative data used to create the sampling frame, mistakes made in entering collected data into the database, and mistakes made in editing and processing the collected data. Every attempt is made to minimize nonsampling error through survey methods such as data editing, imputation methods, and benchmarking of data to current employment totals.

Additional Information

For additional information contact:

Office of Employment and Unemployment Statistics
Occupational Employment Statistics, Room 2135
2 Massachusetts Avenue, NE
Washington, DC, 20212-0001

Telephone: 202-691-6569
Web site: .....www.bls.gov/oes/
E-mail: ..... oesinfo@bls.gov